nection at home the effects were identical with those shown at the Imperial College.

In this country little attention is paid to pianoforte touch, owing, probably, to the use of boxed-up pianos covered with jangling ornaments, when sufficient volume of sound has to be obtained by violently hammering the keys and bobbing down the pedals through harmonics and discords. Moreover, the average pianoforte pupil has too much to do with learning execution to trouble about "touch," and very few professionals produce variations in the quality of their notes at all approaching the possible maximum. It is not surprising, therefore, to find widespread belief in the single-variable theory. At the same time, I do not consider it possible to overlook the numerous results of independent observation which are inconsistent with that theory.

It is much to be hoped that the increasing popularity of the player-piano will lead to increased interest in the more scientific aspects of piano-playing.

The explanation of the acoustical effects produced by the modern pianoforte is probably a dynamical problem of considerable complexity, depending on a number of causes, many of which have hitherto been neglected. It is important that not only should attention be directed to any investigations bearing on the matter which have commonly been overlooked, but that further experiments should be carried on with the object of better localising the apparent discrepancy which exists between theory and observation.

G. H. Bryan.

AGRICULTURAL EDUCATION.

FOR many years past technical education of a more or less efficient kind has been provided for the majority of our leading industries, but for some reason or other our greatest industry of all, and that on which indirectly all the others depend, has been left with scarcely any provision at all. It may be that this is due to the fact that agriculture is the nurseling of one Government Department and education of another, and that under our rigid red-tape-bound system, agriculture has no dealings with education. It gives peculiar pleasure, therefore, to note that this system shows signs of amendment, and one of the firstfruits of reform is seen in a memorandum recently issued by the Board of Agriculture and Fisheries to local authorities in England and Wales offering grants from the newly-established development fund towards the furtherance of technical instruction in agriculture and horticulture.

The grants promised are intended to aid (1) in the establishment of advisory councils to be set up in each county or group of counties for the purpose of reviewing, governing, and co-ordinating or initiating schemes for providing higher agricultural education and educational experiments in connection therewith; (2) in the provision and maintenance of buildings and lands for farm schools and farm institutes, at which young agriculturists and others whose daily business is connected with the land may obtain scientific and practical instruction in the technicalities of their art. At each of these schools and institutes it is intended that a highly efficient staff shall be maintained to give short courses of instruction in summer and winter suited to the requirements of the district, also to conduct experimental and research work, and to which agriculturists can apply for advice in cases of difficulty. The grants for farm schools and institutes may be partly annual where new or additional work is being undertaken.

Somewhat stringent conditions are laid down for the administration of the grants to prevent their being applied to the relief of the ratepayers in those districts where such work has already been begun, but that these districts may not be discouraged, the proportion of the grant to the actual expenditure may vary from 50 to 75 per cent., having regard to the financial burden hitherto undertaken by each local authority in this direction.

A covering letter directs attention to the leading provisions of the memorandum, and gives, amongst other things, the Board's ideas with regard to the appointment and duties of a responsible official or organiser in each county or division. The success or otherwise of the scheme will depend very largely upon whether the right man is or is not found for this important post, and as suitable men cannot at the present time be very plentiful, the authorities will be well advised not to insist too rigidly on the paper qualifications of the candidates, but to judge each on his merits, past performances, and experience in agricultural education and organisation.

The scheme outlined contains the germ of an excellent system, but its success or failure will depend largely upon the skill and tact with which it is developed. When the curricula and atmosphere of our rural elementary and secondary schools have been reformed so as to complete the scheme, and the inherent prejudices of the farming community have been overcome, we may hope for a good return for the money spent, but we must not look for abundance of fruit before the tree has had time to take root and expand its branches. Progress will doubtless be slow, and much patience, skill, and trouble will have to be expended before a crop may be looked for.

William Aldridge.

NOTES.

At the meeting of the Linnean Society on May 1 Prof. Hermann von Vöchting was elected a foreign member, and the president announced that it had been decided to award the Linnean medal to Prof. Adolf Engler.

The council of the Manchester Literary and Philosophical Society has nominated Sir Thomas H. Holland, K.C.I.E., F.R.S., to represent the society at the twelfth International Congress of Geology, to be held in Toronto in August next.

A message from the Wellington correspondent of *The Times* on May 1 says:—Miss Procter's mission to New Zealand to urge the establishment of a solar physics observatory has been successful. Mr. Cawthron, a citizen of Nelson, has offered to give the 10,000*l.* to 12,000*l.* which is estimated to be the sum required.

THE annual autumn meeting of the Institute of Metals will this year, under the presidency of Prof. A. K. Huntington, be held on the Continent, for the first time since the institute's formation in 1908. It will take place in connection with the Ghent International Exhibition, the dates fixed being August 28–30. Among many important papers to be communicated will be the report of the corrosion committee.

AT a meeting of the Mansion House Committee of the Captain Scott Fund on Monday, May 5, the Lord Mayor announced that the combined funds, including that of *The Daily Telegraph*, amounted to 56,129*l.*, of which 12,493*l.* had been assigned for supplementing the Government provision for the relatives, 1848*l.* towards discharging the liabilities incurred by the expedition and the publication of the scientific results, and 6112*l.* for a memorial, leaving the allocation of the balance, 35,675*l.*, to the discretion of the committee. A committee was appointed to consider and report upon the form the memorial should take.

As announced already, a joint meeting of the Institution of Electrical Engineers with the Société Internationale des Electriciens will be held in Paris on May 21–24. The following papers will be discussed at the meeting:—High-tension continuous-current traction, M. Gratzmuller; single-phase traction, M. Latour; the electrification schemes of the Chemin de Fer du Midi, M. Jullian; the electrification of the Paris suburban lines of the State Railway, A. N. Mazen; railway electrification problems in the United States, H. Parodi; petrol-electric motor trains, J. B. Damoiseau; long-distance transmission of electric energy (continuous current), J. S. Highfield; long-distance transmission of electric energy (three-phase current), M. Leblanc; automatic telephony: application of mechanical devices to the assistance of manual operating in telephone exchanges, W. Slingo.

THE Historical Medical Museum, organised by Mr. Henry S. Wellcome, which is to be opened in London towards the end of June next, will include some objects of particular interest. An important exhibit in the science section will be a large collection of the original apparatus used by Galvani in making his first experiments in galvanism in the eighteenth century. Other exhibits will be a collection of votive offerings for health, ancient microscopes, and optical instruments, amulets and charms connected with English folk medicine, early medical medals and coins from the Græco-Roman period, and early manuscripts and medical books.

ARCHÆOLOGISTS will welcome the announcement that the famous prehistoric camp, known as Maiden Castle—Maidun meaning "Hill of Strength"—near Dorchester, has been, at the suggestion of the King, purchased by the Duchy of Cornwall, and will now be carefully preserved. The camp dates from Celtic times, and formed a shelter for cattle during tribal raids rather than a military fortress. Water was supplied from a Neolithic dew-pond on the summit of the plateau, and the palisading kept at bay wolves and other enemies, while the cattle were left in charge of a few women and children. The cunningly arranged entrances to the camp supply a remarkable example of primitive methods of defence.

AT the annual general meeting of the Marine Biological Association of the United Kingdom, held in the rooms of the Royal Society on April 30, the following officers and members of council were elected for the year:—*President*, Sir Ray Lankester; *Chairman of Council*, Dr. A. E. Shipley; *Hon. Treasurer*, Major J. A. Travers; *Members of Council*, E. T. Browne, L. W. Byrne, Dr. W. T. Calman, Prof. H. J. Fleure, Prof. F. W. Gamble, Sir Eustace Gurney, Commander Campbell Hepworth, Prof. J. P. Hill, E. W. L. Holt, Prof. E. W. MacBride, H. G. Maurice, Dr. E. Schuster, G. W. Smith, Prof. D'Arcy W. Thompson; *Hon. Secretary*, Dr. E. J. Allen. The following governors are also members of council:—G. P. Bidder, the Earl of Portsmouth, Sir Richard Martin, the Hon. N. C. Rothschild, Prof. G. C. Bourne, Dr. A. E. Shipley, Prof. W. A. Herdman.

AT the annual general meeting of the Institution of Civil Engineers, held on Tuesday, April 29, the result of the ballot for the election of officers was declared as follows:—*President*, A. G. Lyster; *Vice-Presidents*, B. H. Blyth, J. Strain, G. R. Jebb, A. Ross; *other Members of Council*, J. A. F. Aspinall, J. A. Brodie, W. B. Bryan, Col. R. E. B. Crompton, C.B., J. M. Dobson, Sir H. F. Donaldson, K.C.B., E. B. Ellington, W. H. Ellis, W. Ferguson, Sir Maurice Fitzmaurice, C.M.G., Sir J. P. Griffith, Dr. C. A. Harrison, W. Hunter, H. E. Jones, Sir Thomas Matthews, Dr. W. H. Maw, C. L. Morgan, B. Mott, A. M. Tippett, Sir Philip Watts, K.C.B., W. B. Worthington, Dr. Dugald Clerk, F.R.S., R. S. Highet, Dr. E. Hopkinson, F. Palmer, and H. N. Ruttan.

THE annual meeting of the Iron and Steel Institute was held on May 1–2, when the Bessemer gold medal for 1913 was presented to Mr. Adolphe Greiner by the president, Mr. Arthur Cooper. In making the presentation, the president said Mr. Greiner was in 1864 appointed chemical engineer, and in 1887 general director of the steel works of Messrs. John Cockerill, Seraing, Belgium. He was responsible for the introduction into Belgian iron and steel practice of the basic processes, and has been to the front in the utilisation of blast furnace and coke oven gas. The Andrew Carnegie gold medal for 1912 was presented to Dr. J. Newton Friend. The annual dinner was held on the evening of May 1. Mr. R. Elliot-Cooper, president of the Institution of Civil Engineers, spoke of the importance of the work of standardisation of materials, in which the institute has been engaged. Sir Alexander Henderson in the course of a speech remarked that science has done more for the iron and steel industry than for any other. The president of the institute said the growth of the iron and steel industry is seen in the fact that during the life of the institute the production of steel has grown from 600,000 to 60,000,000 tons per annum.

IT would appear from the recent annual report of the Decimal Association that the General Medical Council has announced that all measures and weights in the new British Pharmacopœia, including those referring to dosage, will be in the metric system, and that in order to facilitate the use of the work by medical men, the equivalents for dosage will also be given in the Imperial system. Further progress is also reported in connection with the adoption of the metric carat of 200 milligrams as an international unit for the sale of diamonds and precious stones. Owing, no doubt, to the steady advance made by this unit on the Continent, the views of the trade in this country with respect to it appear to have undergone considerable change recently, and to be now generally in favour of the legalisation of the metric carat. It is confidently expected that steps will be taken very shortly by the Government to issue an Order in Council legalising the metric carat, as well as a series of multiples and submultiples of that unit. The effect of this legislation will be to render the present arbitrary and unrecognised carat illegal and to bring the weights and balances used by merchants and dealers for the sale of precious stones by weight under the purview of the local inspectors of weights and measures. A law has recently been passed in Belgium making the use of the metric carat obligatory in that country, and it is anticipated that a similar step will be taken at an early date in the United States, and possibly also in Russia.

WE understand that the Easter vacation season, just concluded, at the Port Erin Biological Station, has probably, taken all round, been the most successful one yet held. The number of senior students and of post-graduate researchers at work in the institution during March and April was above sixty. *Amphidinium operculatum,* the minute brown dinoflagellate which was found for the first time in Britain at Port Erin a couple of years ago, and has kept on occurring since from time to time in vast quantities, was present in abundance during the greater part of April, and was the subject of some interesting experiments and observations. The marine plankton was abundant during the greater part of the vacation, and the catches showed, early in April, the spring diatoms making their appearance in great numbers—at first round the coast on both east and west sides of the island; and not appearing out at sea (*e.g.* at the five-mile station) until a week or so later. Unusually large quantities of floating fish eggs seemed to be present in the tow-nets out at sea (the species have not yet been identified, nor the exact numbers in the hauls estimated), and the results in the fish hatchery attached to the biological station have been exceptionally favourable. The hatching work is still in progress, spawning is not quite finished, so final figures cannot yet be given, but it looks as if this year might be a record one in fish-hatching. By April 24 more than eight and a half millions of plaice eggs had passed into the hatching boxes, and above seven millions of hatched fry had been distributed out at sea.

AT a meeting of the Society of Engineers (Incorporated), held on Monday, May 5, a paper on tidal waters as a source of power was read by Mr. C. A. Battiscombe, the object of the paper being to direct attention generally to the commercial possibilities of hydro-electric installations in the British Isles, more particularly with regard to the use of the tides. After some introductory remarks in reference to tidal intervals and the range of neap tides, the author pointed out that in this connection the head of water available for actuating turbines cannot exceed one-third of the range of minimum tides. An outline was given of the arrangements proposed for the constant maintenance of a working head, by means of a chamber for the turbines, connected by valves to the tidal way and to three reservoirs in which the tidal water may be impounded. It was claimed that the utilisation of the tides for power purposes presents few engineering difficulties so far as principles are concerned, but that the real difficulty lies in the question of cost, and therefore in the choice of the site and in the design of the structural details. The author concluded by insisting on the importance of regarding the supply of fuel as a matter that concerns the whole nation: that the demand for combustible fuel is continually increasing, and that coal being practically the only fuel found in England, it would be mere folly to neglect any other available source of energy whereby the present rate of consumption of coal may be sensibly reduced. It was submitted that not only can the tides be utilised as a constant source of power, but that, taken in conjunction with the power that could be derived from fresh-water rivers, their utilisation would be a great gain to the commercial and industrial interests of the United Kingdom.

THE majority of the papers read before the first International Eugenics Congress, held in London in July, 1912, were published at the beginning of the congress in a volume entitled "Problems in Eugenics." Some, however, were received too late to be included therein, and these, together with a report of the discussions which took place at the congress and the speeches which were delivered at the inaugural banquet, have now been published in a supplementary volume ("Problems in Eugenics," vol. ii.; London: The Eugenics Education Society, 1913, pp. 196). In the preface Major Leonard Darwin directs attention to the fact that an international eugenics committee has been established on a permanent basis as a result of the congress. The primary object of this committee, which will meet in Paris next August, is to settle questions connected with the future assembly of eugenics congresses, but it is hoped that it may also fulfil the useful function of a clearing-house for information on eugenic matters.

THOSE who are prepared to accept the view that many, or all, megalithic monuments were designed for the purpose of astronomical observations will be interested in an elaborate paper by Dr. Marcel Baudouin, entitled "Le siège d'observation de Chergiroux à l'Ile d'Yeu (Vendée)," published in vol. iii., sixth series, parts 5 and 6, of the *Bulletins et Mémoires de la Société d'Anthropologie de Paris* for

1912. The learned author has discussed the question with much care and learning, and though some may still hesitate to accept his conclusions, his communication deserves the attention of all who are interested in the astronomical aspect of megalithic monuments.

THE attention of students of African ethnology may be invited to an important paper, "Notes on the Geographical Distribution of the Hottentot and Bantu in South Africa," by Mr. W. H. Tooke, published in part v., vol. ii., of Records of the Albany Museum of Grahamstown. The cradle of the Hottentot race he believes to have been the region now occupied by the Hamitic tribes—Berbers, Gallas, Somali, and Masai. But there are mixed races containing negro, Semitic, and Caucasian elements, and the problem remains whether any of these tribes are derived from a prototype of which the Hottentot is evidently, from close conformity to persistence of type, the present representative. He groups the Bantu into four divisions—inland, including the Makalanga and the Bechwana; coastal, the Baronga or Tekeza, and the Zulu-Xosa or Zulu-Kaffir. The movements of these groups are intricate and obscure, but the information collected by Mr. Tooke will help towards a scientific solution of these tangled problems. The importance of the study of stone implements in the same region was urged in his lecture, delivered on February 29, before the African Society by Prof. Henry Balfour, on the earliest inhabitants of South Africa.

To the April number of *The Geological Magazine* Mr. R. B. Newton contributes a note on the fossils in the Pennant collection, recently presented to the British Museum (Natural History) by Lord and Lady Denbigh. These include about a thousand specimens, some of which were described and figured by Pennant himself. A selection has been placed on exhibition in the geological department.

THE extent to which the native fauna is disappearing in Victoria may be inferred from the following paragraph relating to the Darby district in the March number of *The Victorian Naturalist*:—"Only a few years ago the koalas, or native bears, were numerous, and could be seen here at any time. Wallabies, dingoes, and the introduced hog-deer were also common, but are now replaced by the fox."

IN the Bulletin of the American Museum of Natural History, vol. xxxii., art. 2, Mr. R. J. Coles records a method of obtaining embryos of large rays. Having observed that female rays appeared to have expelled their embryos in their struggles when taken in nets, the author resorted to the plan of jumping into the water as a seine containing a ray was drawn into the shallows, stabbing the fish with a knife in the back of the head, and then holding on to the knife-handle with one hand, and plugging the vent with the other. The fish was then dragged ashore, when the young would be ejected on the sand. The author then describes, with illustrations, the embryos of several species, and also adduces evidence to show that there is a regular northward summer migration of certain tropical species of rays along the Atlantic coast of North America.

IN an article on the late Prof. Alpheus Hyatt and his principles of research, published in the April number of *The American Naturalist*, Dr. R. T. Jackson emphasises the importance of these researches in respect to the phylogeny and mutual relationships of invertebrates. Stages in development, more especially post-embryonic, were a favourite subject with Hyatt, who inculcated the law that the development of the individual is an epitome of that of its group. He also insisted on the importance of a due recognition of parallelism in development, and originated the theory of acceleration of development, as well as directing attention to senile degenerate development. In conclusion, the biographer expresses the belief that in the future "Hyatt will be looked on as the mastermind who pointed out the methods by which to ascertain the true phylogenetic relations of invertebrate organic forms."

THE first part of vol. cv. of the *Zeitschrift für wissenschaftliche Zoologie* contains three papers of considerable interest to embryologists. The first, by Theodor Baumeister, deals with some early stages in the development of the hedgehog. As this animal is sometimes regarded as the oldest living mammal it has already received a large amount of attention at the hands of embryologists, but the present memoir serves to fill an important gap in our knowledge. The second, by Eva Krüger, treats of the reproduction and gametogenesis of the nematode *Rhabditis aberrans*, n. sp., while the development of a more familiar nematode, the well-known fresh-water form, *Gordius aquaticus*, claims the attention of N. Th. Meyer. The segmentation of the egg in the species last-named has been worked out in detail, and the figures are sufficiently convincing. The process of gastrulation, however, appears to take place in a very remarkable manner. The mesenchyme is stated to be formed by an early unipolar immigration, while the alimentary canal arises from two opposite invaginations which meet and fuse together to form a tube, the hinder of the two forming both midgut and proctodæum. The proboscis arises as a second invagination of the anterior end. The author himself appears not quite to be convinced as to the correctness of his account of the formation of the alimentary canal.

AMONG the most recent publications of the Department of Applied Statistics, University College, London, is an investigation into the mortality of the tuberculous after sanatorium and tuberculin treatment, by Mr. W. Palin Elderton and Mr. Sidney J. Perry. The data from which they worked consisted of records of 3000 cases from the Adirondack Cottage Sanitarium, provided by Dr. Lawrason Brown, of smaller numbers from Scottish sanatoria, provided by Dr. Rest and Dr. Guy, and of particulars of cases dating from 1845 to 1870, from the case books of Dr. Austin Flint, which serve as a guide to the mortality of the consumptive in America in pre-sanatorium days. The most interesting of the conclusions arrived at is stated by the authors as follows:—"There is no evidence in the mortality shown from the data before us to prove that tuberculin as compared with ordinary sanatorium treatment appreciably lengthens the life of the consumptive. If the use of tuberculin had the very marked results claimed by some of its supporters we should have anticipated more definite evidence of its effect on mortality."

A RECENT memoir by Capt. R. T. Wells on dysentery in Haziribagh Central Jail (Scientific Memoirs by Officers of the Medical and Sanitary Departments of the Government of India, No. 52) contains a number of important data bearing on the question of the relation of amœbæ to the causation of dysentery. From this, as well as from other recent investigations, it is very clear that great care must be taken to distinguish clearly between harmless contamination-amœbæ and the pathogenic amœbæ which are the true cause of the disease. Contamination-amœbæ can be cultivated from fæces, tap-water, and other materials by planting them on Musgrave's medium; their cysts are air-borne, and readily gain access to fæces or specimens of pus, however carefully collected, or to any material planted on Musgrave's medium contained in Petri dishes. The true dysenteric amœbæ differ in their microscopic characters from the contamination-amœbæ, and they do not live more than a few hours after discharge from the body, whether transferred to Musgrave's medium or not. The failure to distinguish between these two types of amœbæ has led in many cases to very erroneous conclusions being drawn.

To *Symons's Meteorological Magazine* for April Mr. R. C. Mossman contributes the second of his interesting papers upon Southern Hemisphere seasonal correlations, showing that in the month of May a pronounced opposition exists between the barometric pressure at Stykkisholm, Iceland, lat. 65° N., and Laurie Island, South Orkneys, lat. 61° S. The corrected mean pressure at these two places for the month in question, for the years 1902–11, was respectively 29·91 and 29·32 in. An examination of the barometric data at other places shows that in South America, south of about lat. 47°, the pressure departures are in harmony with those at South Orkneys and South Georgia; but data from intertropical and other regions, *e.g.* the Azores, United States, &c., show indefinite results. The author therefrom concludes "that the dominating factor influencing these May pressure variations in the North and South Atlantic is to be found in the polar regions." As to why the striking differences obtain only in the month of May no explanation is offered. Some interesting notes are also made relating to the variations of wind circulation accompanying the differences of pressure in the extreme South and far North Atlantic.

THE February number of *Lĕss* (*The Forest*) contains articles on the influence of forests on the soil, climate, salubrity, &c., questions already much discussed, and on the modifications caused by man in the distribution of birds. Some birds frequent human habitations to build nests on house roofs, or to obtain food, especially in winter. Wading birds have been driven away by the draining of marshes, and the destruction of woods has deprived certain species of their natural nesting-places, while the fields and meadows which have taken their place have attracted other species. Instances are given of the effect of these changes in Russia.

DURING the solar eclipse of April 17, 1912, determinations of magnetic declination were made by a number of observers in order to detect any direct action of the eclipse on the magnetic state of the earth. The general verdict was that the effect, if it existed at all, was very small. Dr. S. Kalinowski, of Warsaw, however, directed attention in the October, 1912, number of *Terrestrial Magnetism* to the decided difference in the declination curves obtained by him during the eclipse, and at the same hours on the preceding and following days. The normal increase in the westerly declination was replaced by a small decrease followed by a rather rapid increase. Dr. Kalinowski pointed out that the same effect was exhibited in a less marked degree in the curves obtained at Beuthen, but that the Potsdam curves did not show it. In a letter to the editor of *Terrestrial Magnetism*, published in the March, 1913, number, Dr. S. van Dijk states that the curves obtained during the eclipse at De Bilt, Holland, show an effect of the same character as that found by Dr. Kalinowski.

MESSRS. WILLIAMS AND NORGATE inform us that in the advertisement of some of the volumes in the Home University Library, announced in last week's issue, "An Introduction to Mathematics" was, through an oversight, attributed to the Hon. B. Russell in place of Mr. A. N. Whitehead, F.R.S. The volume is correctly advertised in the present issue.

OUR ASTRONOMICAL COLUMN.

THE SPECTRA OF NOVA GEMINORUM.—In the publications of the Allegheny Observatory of the University of Pittsburg (vol. iii., No. 3) Mr. F. C. Jordan gives a description of eighteen spectrograms of Nova Geminorum (No. 2). The first of the series of photographs was secured on March 16, when the bright lines were strongly developed on the plate, and the absorption lines a little less so, and the last on April 14, when no absorption lines were detected at all. The author gives tables of the wave-lengths determined, and a series of intensity curves. He mentions the curious fact that with regard to the H and K absorption lines the weighted means of the velocities deduced from them yield a curve which follows to some extent the light variations of the nova, the velocities being positive when the star is brighter and negative when it is fainter. Mr. Jordan suggests that it would be very desirable to examine the velocity determinations from plates secured at other observatories, and for this and other points of view he would place all the plates he secured at the disposal of any astronomer or institution that may decide to undertake such a discussion.

Another paper of importance in connection with this nova is that printed in the Monthly Notices of the R.A.S. (vol. lxxiii., No. 5, p. 380). The authors, Prof. H. F. Newall and Mr. F. J. Stratton, describe a detailed study they have made of the spectrum of the nova on March 15, and they come to the conclusion that the absorption lines are for the most part identical with the lines in α Cygni, and to a small percentage in γ Cygni; or, in other words, the nova spectrum of that date was an enhanced-line spectrum. The